



Baseline Assessment for the Smooth Operation of Solar Mini Grid Facility in Umon Island and Bagana Community in Southern Nigeria

****Uyigue E., Uyigue P. O. and Iyalekhue O.***

Community Research and Development Centre

www.credcent.org

[email: etiosa@credcentre.org](mailto:etiosa@credcentre.org)

About the Community Research and Development Centre

- Project development and implementation
- Solar micro and mini grid projects development and operation
- Energy and environmental related studies
- Renewable energy and energy efficiency training
- Environmental and renewable energy advocacy

Outline

- Introduction
- Justification for the study
- Objectives of Study
- Methodology for the study
- Results
- Discussion and recommendations

Introduction

- Only about 50% of Nigerians (170 million people) is connected to the national electricity grid
- Grid-generated electricity in Nigeria barely reaches 5000 MW
- Demand greatly exceed supply; demand is in excess of 10,000 MW and 30,000 MW for industrial take off
- Those connected to the grid experience power outages that last for several hours
- Many rural communities are not connected to the national electricity grid

Justification for the study

- Project location – Umon Island and Bagana Community
- Type of mini grid – 50kW Solar mini grid (no back up diesel generator)
- Number of potential customers – 181 potential customers
- Project developer and operator – Community Research and Development Centre
- Technical partner – Integration Environment and Energy GmbH, Germany
- Supporting partners – GIZ, EU and the Cross River State Government
- To collect baseline information that is required to enhance the smooth operation of the mini-grid.



Objectives of Study

- To determine the average electricity needs of different households, businesses and other potential users of electricity.
- To determine the total electricity needs of the Communities
- To collect baseline energy information and assess the Community's willingness and ability to pay for electricity generated from mini-grid

Methodology

- **Interview with Key Informants:** The key informants are those people who are privileged to know the Communities very well
- **Questionnaire Administration:** Questionnaires were administered randomly to the adult population, each respondent representing a household
- **Review of Existing Literature:** Existing documentations on the communities were sourced to elicit information relevant to the study
- **Direct Observation:** Electronic data recording devices such as still camera were used to capture any peculiar scene or object that will be relevant to the study.

Results

- Number of houses in Umon Island is 225; number of houses in Bagana Community is 28 making a total of 253 houses that will be served by the mini grid
- Combined population of the two communities is estimated to be 5000; male to female ratio of 3:2
- Number of potential customers is 181
- In addition, there are 6 churches, 2 health clinics and 3 schools within the coverage area of the power plant.
- Occupations of inhabitants are fishing, farming, petty trading and boat building



Plate 1: Aerial photograph of Umon Island and Bagana Community (Source: Google Earth)



Plate 2: Fishing activities along River Cross

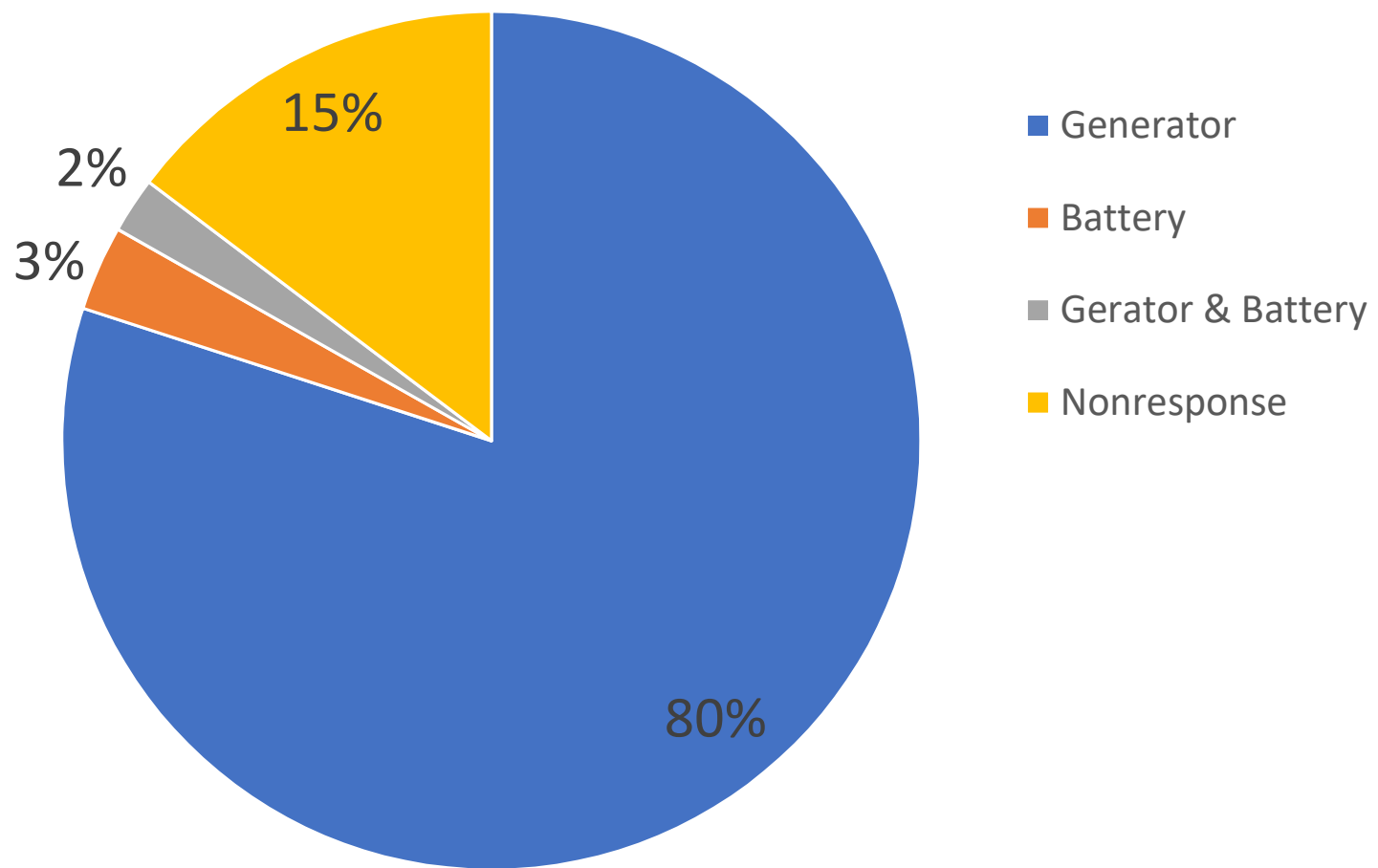


Fig. 1: Different sources of electricity



Plate 3: Different generator sets at Umon Island

Table 1: Cost of different fuel types

	Fuel	Cost
1	Kerosene	N450/Litre
2	Petrol	N200/Litre
3	Firewood	Free
4	Charcoal	Free
5	Batteries	N200/Pair

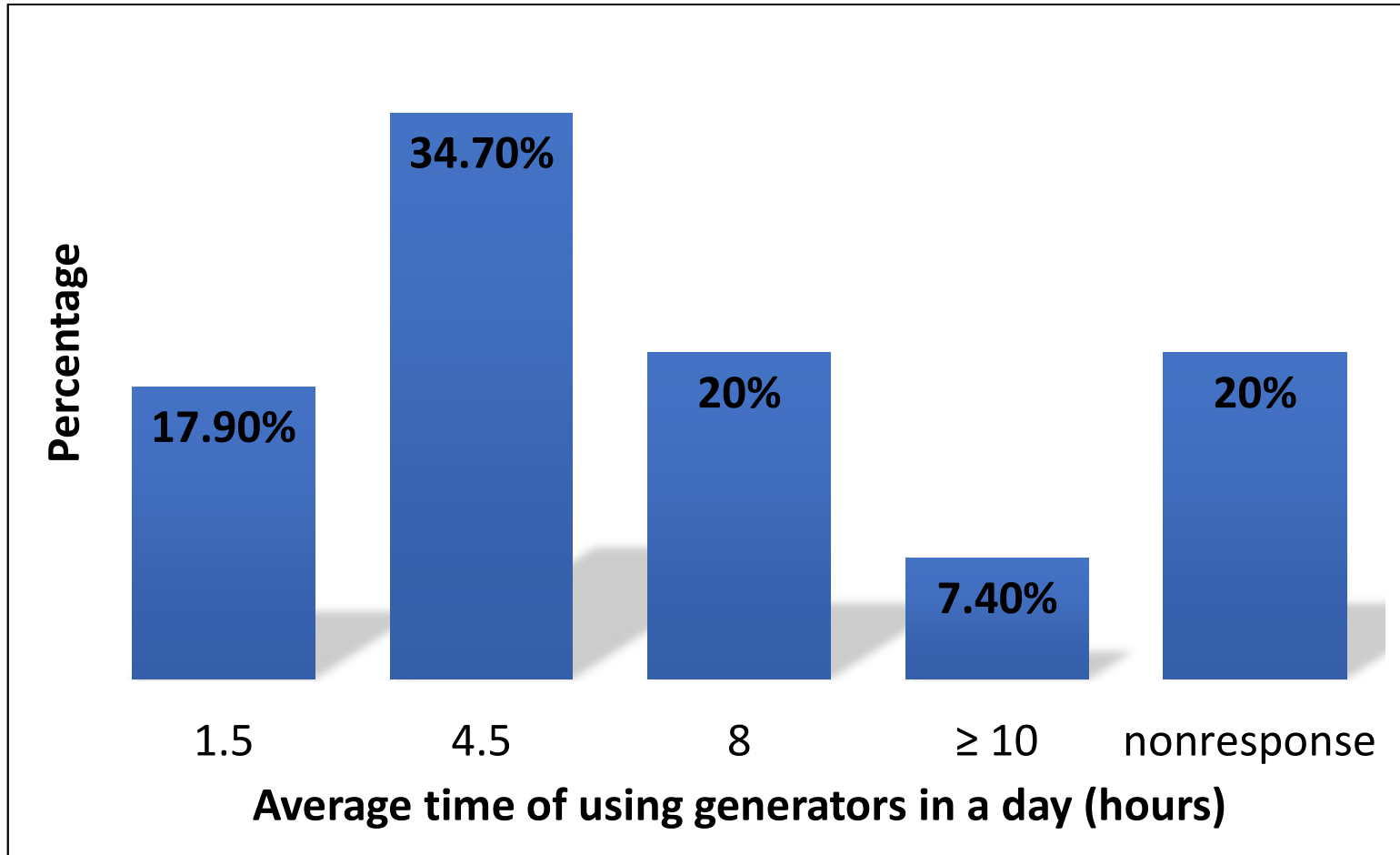


Fig. 2. Average time of using generators per day

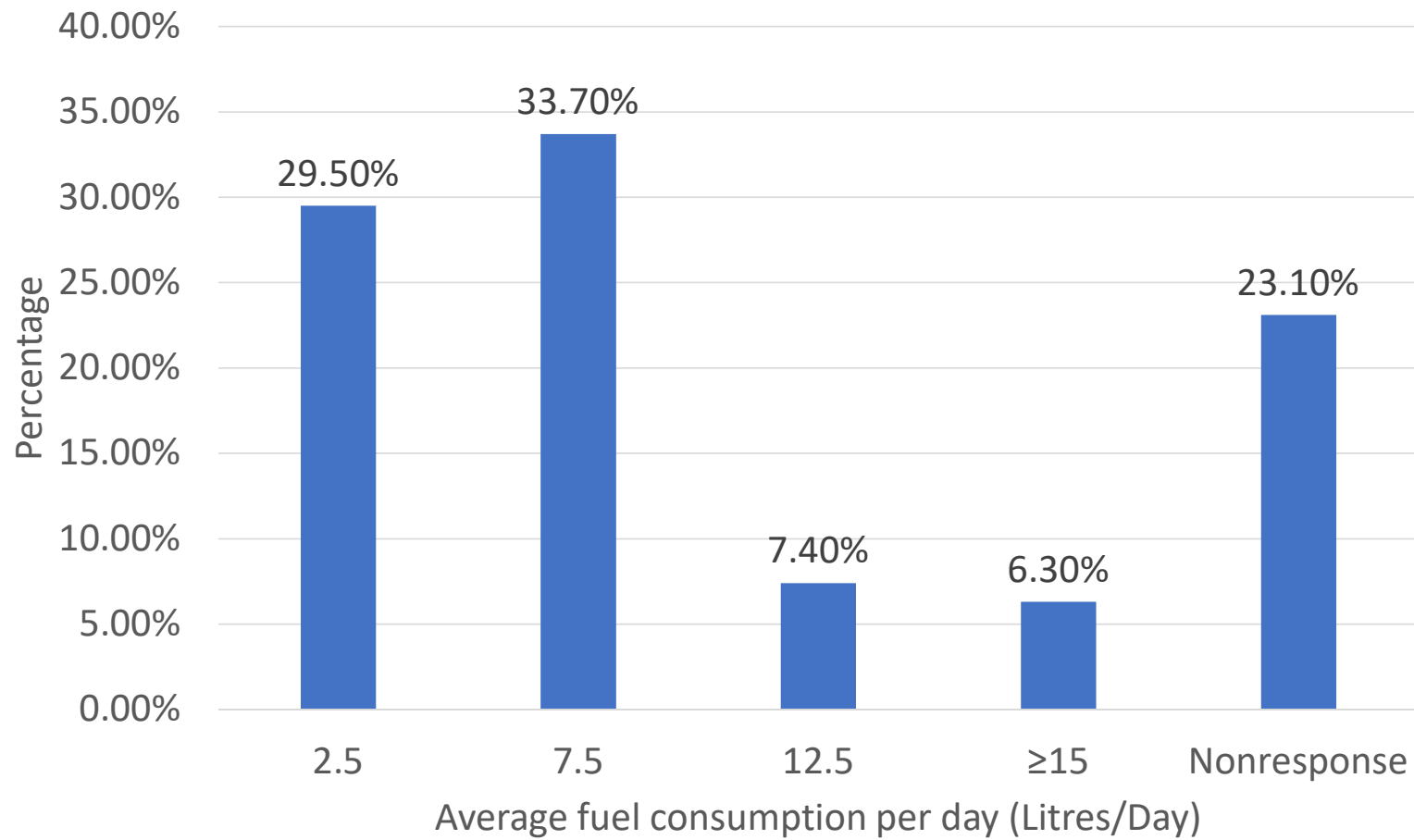


Fig. 3: Average fuel for operating generators in a day (Litres/Day)

Type of light bulb	Calculated peak load for 94 households	Contribution of Lighting	Average Peak Load	Total Peak Load
Incandescent	83,433	49%	887.59	224, 560
CFLs (15 W)	50,779	16%	540.20	136,671
LEDs (7 W)	46,483	8%	494.50	125,109

Table 2: Estimated peak load for the different lighting appliances

Table 3: Respondents' perception of the mini grid

	Description of parameter	Percentage
1	Knowledge of PV application	85%
2	Willingness to connect to the Mini-grid	94%
3	Willingness to pay for electricity from the Mini-grid	93%

Table 4: Monthly expenditure on self-generated electricity

Respondents	Fuel Consumption (Litre/day)	Fuel Consumption (Litre/Month)	Fuel Expenditure/Month
29.5%	2.5	75	N15,000
33.7%	7.5	225	N45,000
7.4%	12.5	375	N75,000
6.3%	15	450	N90,000

Conclusions and Recommendations

- ***Promote energy efficiency best practices:*** Communities was adequately trained and informed on energy efficiency best practices
- ***Retrofit of Lighting Appliances:*** The use of LED lamps may be expensive for many of the rural dwellers. CREDC will design a credit scheme to deploy the LED and payment made through the electricity bills
- **Monitoring of Customers' Connection:** CREDC will carefully monitor the connections to the facility to avoid power interruption
- **Regular Data Collection:** CREDC will carry out regular data collection to sustain the operation of the system and to improve on services.

Thank You